

easy to a beginner; that, in fact, there are no real difficulties which must be fairly faced by every student. We are surprised to find that this opinion can be held by any sound and successful teacher. Our own experience has always been dead against it. Dr. Lodge says of the elementary works of Thomson and Tait, Clerk-Maxwell, and Clifford, that they are "far too difficult for beginners." We do not think that his process of dilution makes the matter a whit less difficult. It has rather a tendency to conceal from the reader the place where the real difficulty lies, and a necessary difficulty *avoided* is certainly not *overcome*. Second, the avoidance of difficulties is managed by loose and sometimes even metaphysical language (see, for instance, pp. 83-5); evidently embodying some of the speculations in which the author has indulged while excogitating his work.

As an instance of loose writing take this (p. 16)

"5. The effects of force on matter are:

- A. Change of motion, which is called *acceleration*.
- B. Change of size or shape, which is called *strain* or deformation.

If only one force acts on a body, it must produce the effect A. If two or more forces act in different directions on a body, they must produce B, and they may produce A also." Now, at first sight, this looks well enough, and certainly Dr. Lodge knows the facts thoroughly. But how is *change of motion* called *acceleration*? Acceleration is correctly defined (p. 19) as *Rate of change of velocity*. But (p. 18) velocity is defined as "the rate of motion of a body." Put these extracts along with A above, and we find "change of that whose rate is called velocity is rate of change of velocity;" a very remarkable proposition, indeed one of high metaphysical interest. Again, if only one force act on a body, it *must* produce B unless the body be perfectly rigid. And two or more forces do *not* necessarily produce B, even on the most plastic body. Take the case of two different sets of parallel forces, for instance, each proportional to the mass of the element on which it acts.

In conclusion we may say that for the facts of elementary mechanics, for excellent examples of application of the formulæ, and such like matters, the student may use this work with profit:—but he ought to be warned that where the text appears most simple it is generally loose, often metaphysical, and here and there unintelligible.

Le conchiglie Pompeiane. Descritte dal Dott. Nicola Tiberi. 4to, 12 pp. (Napoli, 1879.)

THIS remarkable and well written memoir was published before the recent celebration at Pompeii of the eighteenth centenary of its destruction by a volcanic eruption of Vesuvius. It is the work of an excellent naturalist, who lives at Resina, close to the site of the ruined city, and who is especially conversant with the shells of the Mediterranean. The point of view to which he directs our attention is very different from that which has been taken by the geologist, antiquary, artist, or architect. He treats of the shells found in the ruins, and which had served for food, or been used by the Pompeians for ornament and other purposes. Indeed we know from Athenæus and other ancient authors that mollusca were then relished quite as much as they are at present by the inhabitants of Italy. I have been unable to discover in the loose and incorrect twaddle of the younger Pliny, who lost his life in the eruption, any mention of shells having been collected by his countrymen for the study of natural history. It is a pursuit or amusement of comparatively modern times. Dr. Tiberi gives a list of all the shells which he has noticed as Pompeian, belonging to no less than 44 species, with particulars of their relative abundance at Pompeii, as well as of their distribution and economy. Some were of eatable kinds, as the common oyster and mussel, *Pecten jacobæus*, *Venus chione*, *Tapes*

decussatus, and several species of *Helix*. Others adorned fountains, as *Haliotis tuberculata*, *Murex trunculus*, and *M. brandaris*. The oriental pearl-shell (*Meleagrina margaritifera*) was represented only by a single valve. But the ladies of Pompeii seem to have attached considerable value to the *Cypræa* or Cowry, as amulets or charms to prevent sterility; and among these shells were some of species from the Red Sea and Persian Gulf. A single specimen of another exotic shell (*Conus textilis*) must have been kept for its great beauty as an object of curiosity. All the shells used in the ornamentation of fountains, five in the city and one in the suburbs, are of species which still are common in the Gulf of Naples; these shells are separately distinguished and named.

The memoir forms a short but interesting chapter of Roman history, and it tells us more than is generally known about the habits of the former masters of the world.

J. GWYN JEFFREYS

Banka und Biliton. Von Dr. E. Reyer. (Vienna, 1879).

IN this pamphlet, originally published as an article in the *Oesterreichischen Zeitschrift für Berg- und Hüttenwesen*, the author has brought together a vast amount of useful information on these two important tin-yielding localities. At the present time, when the trade in this important but sparingly-distributed metal has been almost entirely diverted from its ancient centres in Cornwall and Saxony by the development of the sources of supply in the East Indies and Australia, the valuable details contained in this pamphlet cannot fail to be read with much interest. By far the largest and most reliable part of the information on these districts is inaccessible to most readers, from the fact of its being written in the Dutch language, and Dr. Reyer has done good service in bringing together so much material in a compendious and available form. The geological structure of the districts, the distribution of the ore in them, the methods of working, and the mineral statistics of the two areas, are very fully described, and the monograph concludes with an interesting sketch of the life of the Chinese immigrants who are engaged in working these tin ores in the Malay Archipelago.

J. W. J.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Greenwich Meteorological Observations

MR. BUCHAN (*NATURE*, vol. xx. p. 602) now admits that fundamental mean temperatures are to be found in Table 77. But his original unqualified remark (p. 526) was that mean temperatures for Greenwich "remain still to be calculated"; he even endeavoured to infer the mean annual temperature from the observations of the earth-thermometers, as though Table 77 (containing a value of this element with which no hitherto determined value for Greenwich can compete) had no existence. All this was likely to convey to an uninformed reader a very erroneous impression.

Table 52 contains simply a collection of the mean monthly results given in the twelve tables (38 to 49) referring to diurnal inequality, and as these numbers appeared to sufficiently well represent the varying temperatures of individual months, no account was taken of omitted days. But we can without difficulty determine their influence, usually small, in the months affected, and, in consequence of the now expressed want, shall probably take an opportunity of doing so. The question was of much greater importance as regards the fundamental values of Table 77, in forming which, as before mentioned, and as is

stated in the introduction to the volume, the influence of omitted days was duly taken into account, values for such days being adopted from the eye-observations (usually six daily) corrected for diurnal inequality by means of corrections derived from the discussion of the twenty years' photographs. Thus, among the twenty separate daily values on which each mean daily value in Table 77 depends, one or two may be derived from eye-observations in the way described.

The diurnal variation of temperature in the apartment in which the photographic barometer is placed is, on the average, less than one degree.

WILLIAM ELLIS

Royal Observatory, Greenwich, October 27

Sun-Spots in Earnest

WITH reference to the fine group of sun-spots to which Prof. Piazz Smyth draws attention in *NATURE*, vol. xx. p. 602, it may be interesting to mention that the incipient stage of the group in question is shown on two photographs of the sun taken at the Royal Observatory, Greenwich, on October 16 (two days before the date of Prof. Piazz Smyth's observation). At that time the group consisted of three "veiled" spots and several very small specks hardly to be distinguished from the ordinary pores, together with small faculae. No photographs were obtained on the next day, and on October 18 enormous changes had taken place, the "veiled" spots having developed into fine sun-spots, with nucleus and penumbra. Four photographs taken on this day show that changes were still taking place, and these continued throughout the remainder of the period of visibility of the group, viz., till October 21, when it passed off at the west limb. No trace of the group is to be found on two photographs taken on October 15, so that it would appear to have formed between October 15 and 16, and must have been quite in its infancy when first photographed on October 16, being then very nearly on the central meridian.

Several small spots have appeared on the sun lately, but they have been for the most part very short-lived. Thus a group of spots with faculae, first seen on the east side of the sun on October 15, had completely disappeared on October 16. Another group consisting of six or seven small spots with faculae, which appeared at the east limb on October 7, had completely closed up in the interval between October 10 and 15. On the whole the Greenwich photographs seem to support Prof. Piazz Smyth's conclusion that the period of quiescence is now over, and that the solar activity is decidedly on the increase.

W. H. M. CHRISTIE

Royal Observatory, Greenwich, October 25

THE Kew solar observations now are, unfortunately, limited to a daily inspection of the sun through a 3-inch telescope, and the drawing of a rough sketch of the spots on its surface, should any be visible, the object the Committee have in view being merely a continuation of the enumeration of the groups as they make their appearance, in the same manner as did Hofrath Schwabe.

I have referred to the sketches drawn on the 15th, 16th, 17th, and 18th instants, in order to see what records they afford of the outbreak of the group of spots mentioned by Prof. Piazz Smyth in *NATURE*, vol. xx. p. 602, and find we noted on the 15th two small spots in the sun's northern hemisphere. These were not seen on the 16th, the disk being entered in the register as having "no spots," but at 10.30 A.M. on the 17th a group of small spots appeared to the south of the equator, just in the place occupied on the next day by the group of gigantic spots to which attention has been directed, allowance of course being made for the sun's rotation.

These observations show that the spots did not suddenly burst forth in their full grandeur, but that they broke through the sun's surface gradually, that is to say, the explosion, if such it was, extended over more than twenty-four hours.

In the examination of the Kew solar photographs from 1863 to 1872 now in progress here under the direction of Mr. De la Rue, we have found several instances of similar extensive changes in spots from day to day, not only in the eruption of large spots, but also in their closing up in an equally short space of time.

To give more recent instances, I find that a considerable group of spots was observed on June 28, of which we had no record on the 25th; and again, on July 11, some large spots were noted, whilst on the preceding day, July 10, "no spots" was entered in the register.

The magnetograph curves show a slight disturbance of the

magnetic elements on the 16th and 17th, but during the 18th the needle simply recorded its ordinary daily range.

I trust that better-equipped observers will be able to give you more exact accounts of this interesting phenomenon. The sunshine recorder here indicated continuous sunshine on the 16th, occasional gleams on the 17th, and seven hours on the 18th, so the climate cannot be blamed for any shortcomings on the part of southern observers on this occasion.

G. M. WHIPPLE

Kew Observatory, October 25

THE conclusion as to the increasing activity of the solar surface, drawn by the Astronomer-Royal of Scotland from his observations of a large solar spot on the 18th instant, is strongly confirmed by the present state of the south-east quarters of the sun's disk. Few prominences are now visible in the other portions of the limb, but on the 26th at 23° 10' E. of the south point (direct image), the bright line C of the chromosphere extended to the height of 3' 43" from the limb, and this morning, the 28th, the greatest height was 1' 17" at 18° 46' E. of S. On the 28th the remarkable prominences extended along the limb from—

18° 8' E. of S. to 38° E. of S.,

and this morning they were traced from—

10° 51' E. of S. to 20° 21'.

The ordinary level of the chromosphere does not extend above 5" from the limb, but to-day it was rather over 6".

Eight prisms of 60° were used in a Browning automatic spectroscope adapted to an 8-inch achromatic.

S. J. FERRY

Stonyhurst Observatory, October 28

Wallace's "Australasia"

ALLOW me to thank the writer of the review in *NATURE*, vol. xx. p. 597, for some valuable criticisms of my book. It is quite refreshing after the common-place praises of most reviews to have one's errors pointed out and omissions noticed, and I hope to make use of such corrections in a forthcoming new edition. At the same time there are a few points on which I wish to say a word. In the first place the book is not a scientific work, but one of a series intended, as expressly stated, "for general reading." This is, of course, no excuse for errors, but it is a sufficient reason for giving *general* rather than detailed descriptions of weapons, canoes, &c., and for occasionally stating roughly the *size* of an article even when it varies greatly, in order to give definite ideas to readers who may be complete strangers to the whole subject.

I quite agree with my reviewer, that too much is included to be properly treated in one volume, but that was a matter dependent on the arrangement of the series, over which I had no control; and as I had in the earlier portion of the work overrun the space allotted me, I was obliged to restrict my notices of many parts of Polynesia, which is no doubt the most imperfect portion of the volume. It is here that the original work is most utilised, and it will be found that most of the passages criticised (including that in which I am charged with "becoming quite poetical") are Hellwald's. Of course, I should have corrected all his small inaccuracies, but it was almost impossible to do so without rewriting his work altogether. No doubt a very interesting volume could be written on Polynesia alone by the aid of the German authorities referred to by the reviewer; but when I state that the time allowed me for the composition of the entire work was six months, and that I actually completed it in eight, it will be seen that I was compelled to limit myself in the study of authorities as well as in the space I could devote to particular islands.

I think my reviewer forgets the character of the book as essentially geographical, when he objects to my treating New Zealand apart from Polynesia; hence I cannot admit the soundness of his criticism on the comparison of the characters of the Fijians and Polynesians, a comparison which, if I remember rightly, is that of an author who knew them both thoroughly—the Rev. G. Turner. I must also demur to the implication that land can never have extended where there is now a sea 2,000 fathoms deep. I suggest (p. 564) an extension of New Zealand as far as the Kermadec Islands as having possibly occurred "at some remote epoch," and I certainly fail to see its impossibility; yet this is what is suggested by my reviewer's remark, that unfortunately there is a depth of 2,000 fathoms between